Nursing home residents' ADL status and its association with going outdoors

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Introduction. The Norwegian regulations for nursing homes consider access to meaningful activities to be an indicator for the quality of nursing homes. Activities of daily living (ADL) are important basic self-care skills for the human beings. Due to physical changes caused by ageing and comorbidities, residents in nursing homes may experience functional decline over time. Such functional impairment may affect their ability to perform meaningful activities, as going outdoors, which in the Norwegian culture is considered a valuable and meaningful activity. The aim of this study was to investigate the association between ADL-status and going outdoors among nursing home residents. **Methods.** This study was a cross-sectional survey of 784 residents aged more than 67 years living in different nursing homes in 15 Norwegian municipalities. Nursing home residents were observed, and the Barthel Index was used to assess ADL-status. Other variables included age, gender, body weight and height, visits, room type, length of stay and participation in the activity going outdoors. Descriptive statistics were used to provide an overview of the residents' characteristics. A multivariate Poisson regression model was used to test the associations between ADL-score and activity level. In case of over-dispersion in the Poisson model, we used a negative binomial regression model. **Results.** More than half (57%) of the nursing home residents in this sample did not go outdoors. **Discussion.** These nursing home residents rarely went outdoors, which is interesting since such activity in Norwegians are appreciated. The residents' ADL-status and age might explain this pattern because more than 50% of the residents had an ADL-score lower than 10, which indicates low performance status. Further the number of visits might explain why some residents went more outdoors than others with fewer visits. Weather conditions and lack of proper equipment, i.e. appropriate shoes, warm clothes and hat in the winter, may also have contributed to the low participation in outdoor activities. **Conclusion.** The availability of outdoor activities for nursing home residents depends on the needs of the individual resident as well as proper equipment and support from others. Nursing home residents

with few family members or friends might benefit from programmes that allow volunteers to provide easy access to activities such as going outdoors

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14 residents were observed, and the Barthel Index was used to assess ADL-status. Other variables

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16 in the activity going outdoors. Descriptive statistics were used to provide an overview of the

17 residents' characteristics. A multivariate Poisson regression model was used to test the

18 associations between ADL-score and activity level. In case of over-dispersion in the Poisson

19 model, we used a negative binomial regression model.

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32

Introduction

Norway is an example of the Nordic welfare model and has a welfare state characterized by public funding and service provision (Esping-Andersen et al., 2002). Access to meaningful activities is a reference for the quality of nursing homes, as highlighted in Norwegian regulations for nursing homes (Forskr kvalitet i pleie- og omsorgstjenestene, 2003). This regulation, with its specific recommendations, can be used as an indicator to assess the quality of care in nursing homes (Kirkevold & Engedal, 2006).

The availability of activities for nursing home residents may contribute to their well-being and dignity (Björk et al., 2017; Lampinen et al., 2006b; Slettebø et al., 2016). By contrast, according to Nåden et al. (2013), lack of participation in activities in nursing homes may be explained by the residents' physical impairments; for example, if residents are restricted to wheelchairs. Up to 80% of nursing home residents experience cognitive impairment (Selbaek et al., 2007), which may also limit their ability to participate in activities such as playing cards, bingo and reading groups (Strøm et al., 2016). Nevertheless, a recent study reported that people with dementia might benefit from cultural activities adapted specifically for this target group (Fossøy et al., 2018) and some people with cognitive impairment can still benefit from physical activities (Jia et al., 2019). Traditionally, outdoor life has a prominent position in Norwegian culture (Gurholt & Broch, 2019), and is considered as a valuable and meaningful activity.

Unfortunately, recent inspections undertaken by the authorities in nursing homes in Norway show lack of activity offerings (Helsetilsynet, 2018a; Helsetilsynet, 2018b; Helsetilsynet, 2018c). Limited activity options indicate that the government's current policy and new regulations to increase the level of activities in Norwegian nursing homes have not succeeded (Helsetilsynet, 2018a; Kjøs & Havig, 2016; Sandvoll et al., 2012).

Changing nursing home practice even given the new regulations, is difficult (Sandvoll et al., 2012). According to Palacios-Cena et al. (2015), nursing homes should strive to develop meaningful activities for residents to occupy their time and to provide residents with a sense of purpose and meaning. However, low level of activity of daily living (ADL) status among the residents can affect their ability to participate in activities (Bürge et al., 2012). ADL are important basic self-care skills for the general population as well as for nursing home residents. Because of physical changes associated with ageing and comorbidities, residents in nursing

64   homes may experience functional decline over time (Drageset et al., 2011; Liu et al., 2015).

65   Reduced ADL status may impair the ability to perform ADL and can impact quality of life,

66   social contact and loneliness (Liu et al., 2014).

67   Physical activity, rehabilitation or exercise may improve independence and prevent the

68   decline in ADL in elderly residents in long-term care facilities (Bürge et al., 2012; Crocker et al.,

69   2013; Liu et al., 2014). It is unclear which interventions are most appropriate for slowing the

70   decline in ADL (Crocker et al., 2013), but it has been suggested that health professionals should

71   promote physical activities with the aim of improving ADL performance among older adults

72   (Bürge et al., 2012). The loss of ADL independence is the strongest predictor of the need for

73   institutionalization of the elderly (Gaugler et al., 2007). Therefore, the Norwegian health care

74   service uses ADL-status as an indicator for delivering nursing home stay.

75   Several factors might influence ADL-status in nursing home residents. Previous research has

76   investigated the importance of ADL-status related to different aspects, such as loneliness, less

77   participation in activities and depression. Drageset has shown that dependence in ADL-status is

78   associated with a high level of social loneliness (Drageset, 2004). A later study by the latter

79   researcher showed that greater dependence in ADL was associated with more symptoms of

80   depression (Drageset et al., 2011). Poor balance, incontinence, impaired cognition, low body

81   mass index (BMI), impaired vision, no daily contact with proxies, impaired hearing and the

82   presence of depression were significant risk factors for nursing home residents who experienced

83   a decline in ADL-status (Bürge et al., 2012).

84   Few studies have focused on the relationships between ADL-status and participation in

85   different activities among nursing home residents. One study investigated physical and social

86   aspects of residents' mobility level and reported that residents dependent on a wheelchair or

87   elevator during care were less involved in physical and social activities compared with more

88   mobile residents (Kjøs & Havig, 2016). This study suggests that reduced mobility might

89   influence participation in different activities offered in the nursing homes. The need for activities

90   and engagement for nursing home residents is well known (Björk et al., 2017; Kjøs & Havig,

91   2016; Lampinen et al., 2006a; Palacios-Ceña et al., 2015; Theurer et al., 2015). More research is

92   needed on residents' ADL-status and its relationships with participation in different activities

93   such as going outdoors.

94   The aim of this study was to investigate the association of nursing home residents ADL-status

95   and how often they go outdoors. The following research question was formulated: *What is the*

96   *association between ADL-status and going outdoors among nursing home residents?*

Methods

98   A cross-sectional study was used to collect data (Polit & Beck, 2017).

99   Going outdoors is the dependent variable in our analysis. The residents either walked on their

100 own or with assistance from staff or visitors. Some residents went outdoors with a walker or in a

101 wheelchair. Some of the residents had electric wheelchair and went outside on their own.

102 However, the purpose was the same, going outdoors.

103 Because the level of this activity was measured as counts, the number of times that the

104 activity was performed during a specific week, we formulated a multivariate Poisson regression

105 model to analyse the distribution of that activity. The independent variables in the model, or the

106 regressors, along with their hypothesis, are as follows:

107 • Age. We expected decreasing levels of activity with increasing age (Feng et al., 2017).

108 • Gender. The gender dummy variable was coded as 1 for men and 0 for women. We had no

109   specific expectations for a gender effect on the activity making trips outside the nursing

110   home.

111 • Number of visits per month. Number of visits is interpreted as a proxy for less social

112   isolation (Drageset, 2004). We expected that more visits would lead to higher levels of the

113   activity 'going outdoors'. More visits may also mean relatives engage in this activity,

114   thereby increasing the level of it.

115 • Ward type. We include a dummy variable for residing in a short-term/rehabilitation ward

116   and one for residing in a long-term ward. The dementia ward is the reference case

117   measured by the model's intercept. Since residents in long-term wards are expected to be

118   older and frailer and in need of more care, we expected these residents to have the lowest

119   levels the activity making trips outside the nursing home.

120 • BMI is an indication of the general health condition. A low BMI indicates that residents

121   are not eating enough (that they fail to maintain body weight). We expected that low BMI

122   would be associated with a fewer trips outside the nursing home.

123 • ADL-score. We expected increasing levels of the activity making trips outside the nursing

124   home with increasing ADL-score, since ADL is a measurement of physical capability

125   (higher score, better function).

126 Using a multivariate model allowed us to control for other regressors when assessing the

127 effect of ADL score. That is, we could compare residents in the same ward and with the same

128 age, gender, number of visits per month and BMI but with different ADL-scores. In this manner,

129 we were able to quantify the direct, independent effect of ADL-score on activity levels.

130 In cases of over-dispersion, we re-estimated the model using a negative binomial regression

131 model. Poisson-regression models may suffer from a feature called over-dispersion, in which the

132 variance is greater than the mean. In an ideal model, these numbers are assumed to be roughly

133 the same (Dormann, 2016). In the Poisson models, goodness-of-fit criteria were estimated using

134 the deviance or Pearson's chi-square statistics. Both values follow the χ^2 distribution with

135 degrees of freedom (df) equal to the number of observations minus the number of estimated

136 parameters in the model (Pedan, 2001). The ratio of χ^2/df is thus the measurement of the model's

137 dispersion. If this is larger than 2, we assumed over-dispersion and used a negative binomial

138 regression model instead of the Poisson model (Susmel, 2015).

139 Over-dispersion may arise because residents copy each other's behaviour. For example, some

140 residents may tend to perform an activity more often if other residents are doing the same. This

141 may lead to so-called 'herding behaviour', which in turn increases the dispersion because of

142 increases in both the activity levels and the difference between residents who participate and

143 those who do not.

144 Our responses are collected among 21 different nursing institutions. They are different

145 institutions since they have different combinations of ward types. Clustering occurs when entities

146 are distributed on several levels. When that is the case, error terms within a cluster will not be

147 independent of error terms in another cluster (Trutschel et al., 2017). In our design, this means

148 that error terms between nursing homes will not be independent since differences between them

149 are not accounted for in the regression model. We have already taken different ward types into

150 consideration. The reason for that is that the chance of a resident performing the activity may be

151 affected by the ward type in which the resident lives. Since nursing homes and ward types are

152   two type of clusters, we should also account for differences between nursing homes in the

153   regression model.

154   If error terms between nursing homes are not independent, the chance of the activity being

155   performed will be affected by what nursing home a resident lives in. The distribution of wards on

156   nursing homes may differ. Some nursing homes may have a short-term ward combined with a

157   dementia ward, others may have a long-term ward combined with a short-term ward etc. This

158   unequal distribution of combinations of ward types may affect the chance of the activity being

159   performed. The nursing homes may have different resources or they may have different

160   organizations depending on the mix of ward types. There may even be different "cultures"

161   meaning that personnel's attention and attitudes towards the activity may differ between them.

162   Nursing homes in Norway are publicly financed. The municipalities have the responsibility

163   for providing this service. The municipalities are financed by grants from the state, and these

164   grants are dependent on objective criteria such as number of persons in different age groups

165   within the municipality, number of elderly persons living alone etc. These criteria are meant to

166   measure the need for the service, and the higher the estimated need, the higher the grant per

167   capita. Municipalities may decide to let private companies provide the service but they are still

168   responsible for financing it. All the nursing homes except one in this study are financed and run

169   by the municipalities. The private one is not run by a commercial actor, but by a parish

170   associated with the cathedral in Bergen, the second largest city (and municipality) in Norway.

171   Since nursing homes all share the financing system, they are in a certain sense not independent

172   of each other as they share the same state budget.

173   Ideally, selection criteria for different ward types are identical for all nursing homes and the

174   Norwegian authorities have a set of criteria, including the patient's ADL-status. This means that

175   the chance of one resident being located in the same ward should be identical from nursing home

176   to nursing home. Allocation of residents on ward type should be based on objective rules and not

177   on discretion, which may differ from municipality to municipality. There should be standards

178   uniformly implemented in each nursing home. However, application of the criteria is depending

179   on clinical judgment, which might vary. Again, if equal consideration of the patient's condition

180   is not the case, discretion applied on municipal and institutional level may affect selection

181   criteria. This may imply that characteristics such as physical capabilities and need for care vary

182   between nursing homes that may affect the chance of an activity being performed. This again

183   means that institutions should be included in the model.

184   One might argue that differences between nursing homes are better accounted for at the

185   municipal level since some nursing homes are located in the same municipality. We have

186   decided including institutions and not municipalities since we expect organizational practices

187   and discretion at the institutional level to have an impact of the activity going outdoors.

188   We assume that nursing homes represent a latent variable, which represent several

189   unmeasured characteristics that vary between them. These characteristics may be different

190   service quality, different organizations, different informal routines established between staff,

191   different efficiency in using resources, different resident characteristics etc. Since these

192   characteristics are not measured and probably cannot be measured, it may be better to include the

193   latent variable as random effects in the regression model. Consequently, we estimated a model

194   using nursing homes as random effects. This means that estimated coefficients are allowed to

195   vary between nursing homes. The fixed effects are the effects of different ward types. These are

196   common for all institutions. Each nursing institution has an individual-specific random effects in

197   addition to this fixed effect (SAS Institute, 2019).

198   When we introduce nursing homes as random effects, we also allow for the fact that not

199   all types of nursing homes are included. Our institutions represent a sample from a larger

200   population of unknown size and characteristics. We do not know the defining characteristics for

201   the population of nursing homes. Therefore, nursing home is not a level variable like ward types

202   where there is a predefined set of possible values. We understand this to be the main difference

203   between using nursing homes as dummy variables or introduce them as random effects. When

204   we use dummy variables we only include the nursing homes for which we have data. When we

205   introduce them as random effects we acknowledge that the observed nursing homes are only a

206   random sample of a wider population and that the characteristics of that population is a latent,

207   unmeasured factor that should be accounted for.

208   Service quality may also differ between nursing homes because of reasons given above.

209   The effects we may find between nursing homes on the activity going outdoors could be

210   interpreted as a consequence of characteristics of the residents living in them. It may also be

211   interpreted as a result of how personnel respond to these characteristics and as an expression of

212   the importance they attach to this activity. As such, these effects may serve as a quality indicator.

213

Sample

215 The study included 784 residents aged over 67 years living in 17 different nursing homes in 15

216 Norwegian municipalities. Inclusion criteria's were all residents aged over 67 years living in the

217 randomly selected nursing homes. Exclusion criteria's were residents receiving palliative care,

218 related to ethical considerations, to protect them from harm related to the completion of

219 questionnaires in their presence and because residents in the palliative phase may be unable to

220 take part in outdoor activities described in this paper. Five of the nursing homes were located in

221 rural areas, and the others were located in small villages. These nursing homes were randomly

222 selected and can therefore be considered as representative of the Norwegian context.

Data collection

224 The data were collected by first-year nursing students during their placement in nursing homes

225 between November 2016 and May 2018. The placement was either during autumn semeste

226 eight weeks from the middle of October until the middle of December, or eight weeks during

227 spring semester, from the middle April until the middle of June. Data were collected during

228 daytime, and the process of data collection was discussed and secured by the university teacher

229 and nurses working at the different nursing homes. Student involvement in research is in line

230 with national Norwegian white papers as well as research-based teaching (Healey et al., 2014;

231 Kunnskapsdepartementet, 2013). The Norwegian government want to facilitate more students

232 gain practical experience with research and development during their studies, so-called student

233 active research (Kunnskapsdepartementet, 2013).

234 *Instruments*

235 The students observed the residents using the method described for the Barthel Index scale for

236 measuring performance in ADL, translated to Norwegian by Laake, revised by Saltvedt, et al.

237 (2008). Each performance item is rated on this scale with a given number of points assigned to

238 each level, related to how dependent or independent the resident is, with maximum 20 points in

239 total. The ten variables with possible scores in the Barthel scale are; help needed with eating (0-

240 2), help needed with bathing (0-1), help need with personal hygiene (0-1), help needed with

241 dressing (0-2), presence or absence of faecal incontinence (0-2), presence or absence of urinary

242 incontinence (0-2), help need with toilet use (0-2), help needing with transfers (0-3), help needed

243   with walking/mobility (0-3), help needed with climbing stairs (0-2). The Barthel Index is a

244   standardized, validated, psychometric-tested instrument used widely in the context of elderly

245   care   (Liu et al., 2015; Mahoney & Barthel, 1965). The students recorded

246   the participants' age, gender, body weight and height, visits, room type, length of stay and

247   participation in the activity 'going outdoors'. Previously we have presented findings related to

248   visit frequency among the different wards (Galek et al., 2018).

249   *Limitations*

250   There are some limitations using this approach. Firstly, we are not secured complete

251   randomization in selecting residents for observations. Students may understand the concept

252   differently or they do not apply it consistently. Secondly, a detailed protocol needs to be

253   provided to the students so that observations are made consistently. For instance, what date

254   format should be used, age and length of stay should be integer numbers etc. We could not

255   eliminate ambivalence in the data collection completely but we believe that the sample is a

256   simple random sample of residents in Norwegian nursing homes and that error in collection of

257   data has been corrected to secure reliability.

258   **Analysis**

259   We assume that the activity is the dependent variable and that ADL-status is an independent

260   variable affecting the level of this activity. In addition, we control for several variables that may

261   have an influence on both activity level and ADL-scores, thereby eliminating possible spurious

262   causal factors.

263   Descriptive statistics were used to give an overview of the demographic and clinical

264   characteristics of the participants, including age, gender, BMI, ADL-status and the prevalence of

265   residents' engagement in everyday activities offered in the nursing homes. We sorted the

266   informants into different groups per quartiles from the distribution of ADL-scores as quantified

267   using the Barthel Index. We then analysed the levels of the activity *going outdoors*. To test the

268   effect of ADL-score on going outdoors, we included age, BMI, gender, visits per month, type of

269   ward and ADL-score in a multivariate regression model. This allowed us to estimate the

270   independent, controlled effect of ADL-score on the ADL-status. The data were analysed by

271   applying a Poisson regression model. Poisson regression was used because the dependent

272   variable was measured as counts performed over 1 week. In case of over-dispersion in the

273 Poisson models, we used a negative binomial regression model instead. The two-sided

274 significance level was set to 0.05.

275   All statistical analyses were performed using Statistical Analysis Software (SAS) University

276 Edition provided by SAS Institute, Cary NC, USA.

277 **Ethics**

278 The Regional Medical Ethics Committee (2015/2030 REK WEST, University of Bergen) and

279 Norwegian Social Science Data Services (46303) approved the study, and it was endorsed by all

280 nursing homes. Voluntary, written informed consent was obtained from all participants. In

281 situations were the resident was not able to give consent related to for example dementia or

282 cognitive impairment, either the resident's relatives or the department manager gave consent.

283 The research process emphasized the principles of anonymity, protection from harm and proper

284 data storage (Polit & Beck, 2017; World Medical Association Declaration of Helsinki, 2008).

285 **Results**

286 The sample ($n = 784$) included more women (69%) than men (31%), which is consistent with the

287 population distribution in this age group (Statistisk Sentralbyrå, 2016). Most residents in our

288 sample (55%) resided in a long-term facility, 26% resided in a dementia ward and 19% resided

289 in a short-term ward. The mean ADL-score was 10.1 with a range of 0 to 32 points. We

290 distributed residents into groups according to their ADL-score using the quartiles from the ADL-

291 distribution, which resulted in about the same number of residents in each group. Twenty-eight

292 per cent of the residents had an ADL-score of 0–6 points measured by the Barthel Index, 24%

293 had an ADL-score of 7–10 points, 26% had an ADL-score of 11–14 points and 23% had an

294 ADL-score over 15 points.

295 **Table 1 Sample, gender, mean age and ward**

296

297

298 **Figure 1 Histogram of the distribution of going outdoors the last week**

299   Figure 1 shows the distribution of trips outside the nursing home in the preceding week. The

300 figure shows that the residents rarely moved outdoors: 57.3% never went outdoors during the

301 week, while one resident had 14 trips. A few residents went outdoors more than the majority,

302 which skewed the distribution to the right.

303

304 **Table 2 Association between ADL-score and mean participation in the activity going**

305 **outdoors**

306   Table 2 shows the participation levels of 'going outdoors' in the ADL-groups. The table

307 shows that participation is relatively stable, however decreases in the lowest two ADL-groups.

308   We have estimated a Poisson regression model in order to analyse the relationship between

309 the activity going outdoors, nursing home resident's characteristics and institutional

310 characteristics. A regression coefficient in a Poisson or negative binomial regression model

311 measures the change in the logarithm of the rate of occurrence for an activity caused by a unit

312 change in a specific independent variable. For example, if the coefficient has a value of 0.08, the

313 anti-log of this value is about 1.083, which means that the level of activity has increased by a

314 factor of 1.083 or 8.3%.

315 **Table 3 Descriptive statistics for gender and ward type**

316 **Table 4 Model statistics for Poisson regression model of going outdoors the last week as the**

317 **dependent variable**

318   Table 4 shows goodness-of-fit values for the regression model of trips outside the nursing

319 home in the preceding week as the dependent variable. Institutions are represented as random

320 effects. This means that each institution is allocated an intercept in addition to the model

321 intercept. The model is estimated using SAS GLIMMIX procedure with a Poisson log-link

322 function. The dispersion criteria χ^2/df has a value less than 2. We therefore assume no over-

323 dispersion in the Poisson regression model.

324 **Table 5 Model estimates of trips outdoors last week. Poisson regression**

325

326 **Table 6 Model estimates of trips outdoors last week. Random effects**

327 Table 5 and 6 show the results of the model estimation with trips outdoor as the dependent

328 variable. Long-term ward type is reference case for ward types and its effect is measured by the

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329 model's general intercept. ADL-score has a significant effect on the activity. An increase in
330 ADL-score of 1 was expected to give an increase in the rate of activity level of 1.05. We show
331 this effect by considering two residents, both women aged 85 years, living in a long-term ward,
332 receiving 6 visits per month and having a BMI 23.8 kg/m^2. (The last two numbers are median
333 values). They both live in institution number 1. Resident A had an ADL-score of 10, and resident
334 B an ADL-score of 15. From the model, we expected resident A to take 0.43 trips outside the
335 nursing home in the last week and resident B to take 0.56 trips. Accordingly, we expected that 16
336 days would be needed for resident A to take one trip outdoors, and 13 days would be needed for
337 resident B. Had the two residents lived in institution number 7 the expected number of trips
338 would have been 1.3 and 1.7 trips outdoors, assuming values for age, number of visits, BMI and
339 gender are the same and ADL-score is 10 and 15 respectively, as above. In other word, both
340 resident A and B would have 3 times more trips outdoors if they had been in institution 7 instead
341 of 1. This shows that institutions have an effect. All in all, 8 institutions have significant effects,
342 4 of them are positive. There is therefore empirical evidence for suggesting that organizational
343 differences have an impact on activity trips outdoors. How the institutions are organized, and
344 how important this activity is considered to be in the institutions, obviously determine how often
345 the activity is performed.
346   Table 5 also shows that age, visits per month and ward type had significant effects on the
347 number of trips outdoors during the week. All effects were as expected: increasing age was
348 associated with a lower activity level, whereas an increasing number of visits were associated
349 with more trips outside the nursing home. The effects of short-term ward type was negative,
350 indicating that residents in that ward type took significantly fewer trips outside the nursing home
351 than did residents in the long-term ward. Residents in dementia-ward type took significantly
352 more trips outdoor than residents in long-term ward type. BMI had no significant effect on
353 number of trips made outdoors.

Discussion

355 Our findings show that 57% of the nursing home residents in this sample did not go outdoors.
356 This is consistent with other studies showing that the activities offered in nursing homes are
357 limited (Kjøs & Havig, 2016) and that the residents often are inactive (Harper Ice, 2002). Recent

358 inspections of nursing homes undertaken by the Norwegian authorities confirm the lack of

359 activity offerings (Helsetilsynet, 2018a; Helsetilsynet, 2018b; Helsetilsynet, 2018c).

360   The findings of our study might be explained by the residents' ADL-score, which was low:

361 50% of the residents had an ADL-score between 0 and 10. Further increased age was associated

362 with lower activity level. This low ADL-score indicates that these residents had a low ability to

363 go outdoors. This is consistent with national health policies in Norway, which emphasize that the

364 frailest elderly should receive care in nursing homes. The frailest residents might not be able to

365 move outdoors because of old age, fatigue, frailty or illness (Nåden et al., 2013).

366   However, Björk et al. (2017) performed a similar study in Sweden and reported that 60% of

367 the nursing home residents had moved outdoors during the data collection period (November

368 2013- September 2014). The differences in going outside the nursing home in these similar

369 studies from the Scandinavian health care context are interesting. Weather and the need for

370 appropriate clothing or equipment can impede the ability of residents to move outdoors. Björk et

371 al (2017) probably collected data during the summer, which might explain some of the

372 differences. Our data was collected either during autumn or spring. In Norway the temperature

373 and weather conditions often are warmer and contains less rain during July and August, and the

374 residents is more likely to go outdoors. This might explain why the residents in the Swedish

375 (Björk et al., 2017) study went more outside. Further, our data was collected in the western part

376 of Norway, which contents weather conditions with more rain compared to eastern parts of

377 Norway. In addition, the residents might not have proper clothing like raincoats, warm jackets,

378 appropriate shoes or hats suitable for different weather conditions. The British Broadcasting

379 Cooperation (BBC) has shown how the use of a rickshaw with a roof and cover may be an

380 alternative for helping frail elderly people to move outdoors despite a loss in ADL-status (BBC,

381 2018). The concept of outdoor life, in particular hiking, have had a prominent position in

382 Norwegian culture (Gurholt & Broch, 2019). Further, several of the older population in Norway

383 today have grown up after the last world war, and many have therefore received a basic

384 socialization in the field of outdoor life, and have maintained their association with the activity

385 throughout their lives (Odden, 2008).

386   Physical activity is important for mental well-being among elderly people (Lampinen et al.,

387 2006b). However, our findings show that increasing age was associated with lower activity level,

388 which is also in line with Feng et al (2017). This might imply a natural change form being active

389   to being less active and in need for assistance performing ADL. This corresponds with the

390   process of disengagement which was described by Cumming and Henry in 1961 (Daatland &

391   Solem, 2011). When people get older its natural to gradually withdraw from their social roles

392   and activities they used to perform. This is in line with Adams et al (2011) who found that

393   activity participation in late life are changed from an active social and creative activity to an

394   increased participation in passive social and spiritual activities. Nursing homes have to consider

395   this and meet the resident's individual needs and interests. According to the Norwegian quality

396   regulations, nursing home residents should be offered varied and customized activities (Forskr

397   kvalitet i pleie- og omsorgstjenestene, 2003). Nursing homes needs to facilitate activities suitable

398   for each resident's ADL-status and individual wishes. For example it might be important for

399   residents to have their own personal things near their own chair. A table nearby might contain

400   personal important objects like magazines, books, news paper, medicines or other important

401   objects (Board & McCormack, 2018). Residents who no longer are capable or want to go

402   outside, might appreciate a nice view (Eijkelenboom et al., 2017). Activities are a basic need,

403   and participation in activities might contribute to the well-being and dignity experienced by

404   nursing home residents (Björk et al., 2017; Lampinen et al., 2006b; Slettebø et al., 2016). Such

405   activities should be organized by the staff in close cooperation with relatives because they are

406   familiar with the residents' needs (Sandvoll et al., 2012).

407   Previous research shows that nursing home staff are committed to routines, such as helping

408   residents with personal care, practical help, nutrition and toileting (Harnett, 2010; Sandvoll et al.,

409   2012), and do not always take a person-centred approach (McCormack, 2016) in terms of

410   activities. Nursing homes often lack the opportunity and time to offer activities for all residents,

411   and staff recognize that some residents spend time sitting alone even though staff members know

412   that they might have preferred to join in activities (Sandvoll et al., 2015). Could lack of staff

413   explain the results in our study? Our findings show that number of visits and ward-types had

414   significant effects on the number of trips outside the nursing home during the week (table 6).

415   Residents in dementia-ward type had more visits and took significantly more trips outdoor than

416   residents in long-term ward type. This shows that the visits (from family or volunteers) have an

417   impact on resident's level of activities regarding going outdoors. In Norway, the government has

418   addressed new ideas to solve the staff challenges and suggests that voluntary contributions by

419   relatives and organizations should be included as a way of providing activities for nursing home

420   residents (Det kongelige kulturdepartement, 2018; Helse- og omsorgsdepartementet, 2013).

421   A reform to improve elderly care has been introduced in a recent white paper from the

422   Norwegian government. One of the main areas that need improvement is activities for elderly

423   people living in nursing homes, and the white paper suggests that they should participate in one

424   hour of activity every day (Helse og omsorgsdepartementet, 2018). To provide more activities

425   for nursing home residents, particularly outdoor activities, nursing home staff should be given

426   resources to organize individual, person-centred and customized activities for all residents and to

427   co-ordinate voluntary contributions (e.g., from family members and elderly that want to take part

428   in activities). This is consistent with a recent study by Skinner et al. (2018), who found that the

429   voluntary, unpaid contribution took place within cultural, social and other activities aimed at

430   promoting mental stimulation and well-being. Furthermore, they suggested that the staff in

431   government nursing homes should consider voluntary contributions when they plan the care of

432   residents in long-term care (Skinner et al., 2018). To offer a variety of activities for nursing

433   home residents, activities should be offered both inside the nursing home and outdoors. We also

434   encourage the national authorities to specify in white papers that activities for Norwegian

435   nursing home residents should take place both indoors and outdoors. For residents, unable to go

436   outdoors by their own, rickshaws might serve as an alternative way of enabling them to go

437   outdoors. Our findings show that nursing home residents rarely are activated by going outside,

438   even though the need for activities and engagement for nursing home residents is internationally

439   well known (Björk et al., 2017; Kjøs & Havig, 2016; Lampinen et al., 2006a; Palacios-Ceña et

440   al., 2015; Theurer et al., 2015). Therefore, a greater focus on activities for elderly residents in

441   nursing homes should be increased and customized in line with each resident's individual needs

442   and wishes.

Strengths and weaknesses

444   The strength of this study is the systematic use of standardized, psychometric-tested instruments

445   and measures (Mahoney & Barthel, 1965). One weakness is related to the nursing students'

446   observations used to rate ADL. One obligation of research is not to harm participations; that is,

447   even though self-report is recommended as the gold standard for gathering data (Polit & Beck,

448   2017), self-report was considered to be inappropriate for assessing the ADL of these residents.

449   The student involvement in research might contribute to mutually strengthening research and

450   education. In addition, the process of data collection was discussed and secured by the university

451   teacher and nurses working at the different nursing homes. Another possible weakness is that we

452   did not test for inter-rater bias. Nevertheless, the teacher and the nurse supervisors were available

453   to the students, and a lecture given immediately before this clinical placement highlighted the

454   potential pitfalls.

455   ## Conclusions

456   More than half (57%) of the participants in this study did not go outdoors during the last

457   week. Their ADL-status might explain this pattern because more than 50% of the residents had

458   an ADL-score lower than 10, which indicates low performance status. Planning for nursing home

459   residents' activities requires staff competence in assessing the capacity and needs of all residents.

460   Those residents with few family members or friends might benefit from visits from volunteers

461   taking on an important function in collaboration with the nursing staff in managing different kind

462   of activities, as e.g. going outdoors. Our findings show that residents rarely are outside the

463   nursing home, even though the need for activities and engagement for nursing home residents is

464   well known. Therefore, a greater focus on activities for elderly residents in nursing homes should

465   be increased and customized in line with each resident's individual needs and wishes.

466

467   ## Availability of data and materials

468   The data file supporting the conclusions of this article will be available in the Norwegian Centre

469   for Research Data (NSD) (http://www.nsd.uib.no/nsd/english/index.html) after completion of the

470   study. Data can be shared with readers upon reasonable request to the corresponding author.

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625

Table 1(on next page)

Table 1

Variable	Value	Frequency	Relative Frequency(%)	Mean age (years)
Gender	Female	541	69.0	87.1
	Male	243	31.0	84.7
	Total	784	100.0	86.3
Ward	Dementia	200	26	84.8
	Short term	152	19	83.7
	Long term	432	55	87.9
	Total	784	100	86.3

1

Table 2(on next page)

Table 2

	ADL-Groups				Total
	0–6	**7–10**	**11–14**	**Over 15**	
Number of times going outdoors the last week	0.6	0.7	0.8	1.4	0.8

1

Table 3(on next page)

Table 3

	Frequency	Per cent
Gender		
Women	541	69.01
Men	243	30.99
Total	784	100
Ward type		
Short-term	152	19.39
Long-term	432	55.1
Dementia	200	25.51
Total	784	100

1

Table 4(on next page)

Table 4

Goodness-of-fit criteria	df	χ^2	χ^2/df
Generalized chi-square	774	1216.3	1.57
Number of observations		784	

1

Table 5(on next page)

Table 5

Effect	Estimate	Standard error	df	t value	Pr > |t|
Intercept	0.9408	0.5901	20	1.59	0.1265
ADL	0.05233	0.007784	756	6.72	<.0001
Gender (1=Male)	0.1023	0.08616	756	1.19	0.2356
Age	-0.02376	0.005691	756	-4.18	<.0001
Visit pr month	0.03025	0.003907	756	7.74	<.0001
BMI	-0.00512	0.008445	756	-0.61	0.5448
Dementia	0.4627	0.1155	756	4.01	<.0001
Short-term /rehabilitation ward	-0.3091	0.1351	756	-2.29	0.0224

1

2

Table 6(on next page)

Table 6

Subject	Estimate	Std Err Pred	df	t value	Pr > |t|
InstId 1	-0.451	0.1913	756	-2.36	0.0186
InstId 2	0.5826	0.1774	756	3.28	0.0011
InstId 3	-0.2667	0.1695	756	-1.57	0.116
InstId 4	-0.0467	0.2189	756	-0.21	0.8311
InstId 5	-0.1552	0.3129	756	-0.5	0.6201
InstId 6	-0.4748	0.2255	756	-2.11	0.0356
InstId 7	0.674	0.1524	756	4.42	<.0001
InstId 8	-0.5933	0.2661	756	-2.23	0.0261
InstId 9	0.08366	0.2155	756	0.39	0.6979
InstId 10	-0.05461	0.151	756	-0.36	0.7177
InstId 11	0.6417	0.3119	756	2.06	0.04
InstId 12	0.4061	0.174	756	2.33	0.0199
InstId 13	0.1413	0.2243	756	0.63	0.529
InstId 15	-0.03997	0.1543	756	-0.26	0.7957
InstId 16	-0.3045	0.2407	756	-1.27	0.2063
InstId 17	0.468	0.2545	756	1.84	0.0663
InstId 19	-0.5419	0.2482	756	-2.18	0.0293
InstId 20	0.135	0.2445	756	0.55	0.581
InstId 21	-0.3957	0.3413	756	-1.16	0.2466
InstId 22	0.01132	0.3114	756	0.04	0.971
InstId 23	0.1807	0.2444	756	0.74	0.4598

1

Figure 1

Figure 1